

ABSTRACT

New, hybrid vacuum electronic devices are proposed, in which the electrons are extracted from the nanotube into vacuum. Each nanotube is either placed on the cathode electrode individually or grown normally to the cathode plane. Arrays of the nanotubes are also considered to multiply the output current. Two- and three-terminal device configurations are discussed. In all the cases considered, the device designs are such that both input and output capacitances are extremely low, while the efficiency of the electron extraction into vacuum is very high, so that the estimated operational frequencies are expected to be in a tera-hertz range. New vacuum triode structure with ballistic electron propagation along the nanotube is also considered.